IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION of
Inventor(s): Rioux

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Examiner: Unknown

Title: Modular Tower Structure

Dkt. 62-335

Date: April 1, 2004

SUBMISSION OF PRIORITY CLAIM AND PRIORITY DOCUMENT IN ACCORDANCE WITH THE REQUIREMENTS OF RULE 55

Commissioner for Patents
P.O.Box 1450
Alexandria, VA 22313-1450

Sir:

It is respectfully requested that under the provisions of 35 U.S.C. 119/365 this application be given the benefit of the foreign filing date of the following, a certified copy of which is submitted herewith:

Application No.	Country of Origin	Filed
2,424,599	Canada	April 4, 2003

Respectfully submitted,

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La présente atteste que les documents ci-joints, dont la liste figure ci-dessous, sont des copies authentiques des documents déposés au Bureau des brevets.

This is to certify that the documents attached hereto and identified below are true copies of the documents on file in the Patent Office.

Specification and Drawings, as originally filed, with Application for Patent Serial No: **2,424,599**, on April 4, 2003, by **ANDRE RIOUX**, for "Modular Tower Structure".

Agent certificateur/Certifying Officer

March 5, 2004

Date

Canada

OPIC CIPO

ABSTRACT OF THE DISCLOSURE

A modular tower structure for carrying electricity transmission cables, communication equipment comprising a plurality of rectangular aluminum modular units fixed one to another in vertical alignment, wherein each modular unit has a height, width, breadth and sides, which have a plurality of apertures, the improvement wherein the width and breadth are essentially equal and of 46 ± 1 cm, and the length is selected from 2.0 – 2.5 m. The tower contains less aluminum used while improving on the structural strength of the tower.

MODULAR TOWER STRUCTURE

FIELD OF THE INVENTION

This invention relates to tower structures, pylons, and the like, particularly for carrying cables, communication equipment, for electricity transmission and the like.

BACKGROUND OF THE INVENTION

Conventional towers, pylons, and the like, for carrying cables for electrical transmission across the country have, typically, splayed or parallel legs with relatively large footprints and have connecting cross-members, formed of steel members. Such structures are heavy and take a relatively long time to erect, repair and the like. Replacement in whole, or in part, can take significant amounts of time. In an emergency, when a plurality of such towers are structurally damaged or the cables thereon snapped by the effect of ice build-up due to, e.g. freezing rain, this can cause very serious disruption to the transmission of electricity, throughout a community or larger area.

Recently, alternative tower structures have been introduced as temporary or permanent replacements of the aforesaid steel towers, which replacement towers are formed of aluminum, have a smaller footprint and are faster and easier to erect on site than aforesaid steel towers. These towers are provided in hollow, modular form and are erected from hollow modular units, generally, on site, by the bolting of one modular unit to another unit to the desired height.

Each of the modular units are essentially rectangular in shape and, generally, formed by the welding of four identical angled panels at adjoining vertical edges to form a box of desired height, breadth and width, typically, 2.5 m x 41 cm x 41cm . Relatively large apertures are provided in each of the aluminum sides to offer savings in material and weight while allowing of wind passage.

Such towers have been found to be most structurally sound, lightweight and extremely fast to erect as to offer significant beneficial emergency situation remedial units.

The full tower may be assembled on the ground and raised by means of a crane or helicopter, or built piecemeal in the air by means of a Jim pole assembly technique, to the desired height.

However, there remains a need of the aforesaid aluminum modular tower to minimize on the amount of material used, while improving on the structural strength of the tower.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a modular tower for use as a permanent or temporary, or emergency fixture, for carrying electricity cables, communication cables or the like, which is structurally stronger on a per weight basis than prior art modular towers.

Accordingly, in one aspect the invention provides a modular tower structure for carrying electricity transmission cables, communication equipment and the like, comprising a plurality of rectangular aluminum modular units fixed one to another in vertical alignment, wherein each modular unit has a height, width, breadth and sides, said sides having a plurality of apertures, the improvement wherein said width and breadth are essentially equal and of 46 ± 1 cm, and the length is selected from 2.0 – 2.5 m.

In a further aspect, the invention provides a rectangular aluminum modular unit as hereinabove defined.

I have found that by restricting the structural dimensions to those hereinabove defined, that a 20% increase in structural strength is obtained over the nearest prior art commercial structures.

Further, that by preferably providing each modular unit with a pair of apertures, preferably, of an elongated scallop or completed elongated horseshoe arched shape, the total weight of the tower is less than a comparable prior art tower, notwithstanding the increase in width and breadth of the modular unit according to the invention. The completed elongated horseshoe arch is formed from a pair of segmented shape having a central arc extending through more than a semi-circle, and two identical, reversed, side arcs each spanning less than a quarter circle.

The invention also provides an improved attachment of unitary construction for retaining post insulators, suspension insulators and guy wires.

Thus, in a further aspect, the invention provides an improved metal fitting which provides a swivel mechanism with the tower framework, the insulator head and the guy wire. This permits circular movement at the insulator head in both the vertical and horizontal planes.

Any vibration or gallop of the conductor is not transferred to the tower because of the innovative "free movement" design of the hardware attachment for the insulator. The same design is used for the guy wire attachment.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be better understood, a preferred embodiment will now be described by way of example only, with reference to the accompanying drawings wherein

Fig. 1 is a diagrammatic vertical view of a tower structure according to the prior art;

Fig. 2 is a diagrammatic perspective view of a pre-fabricated module for use in a tower structure according to the prior art;

Fig. 3 is a diagrammatic perspective view of a pre-fabricated module for use in a tower structure according to the invention;

Fig. 4 is a diagrammatic vertical view of a tower structure according to the present invention;

Figs. 5-13 represent diagrammatic sketches of a fitting according to the invention;

and wherein the same numerals denote like parts.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

With reference to Fig. 1, this shows generally as 10 a tower formed of a plurality of aluminum modular units 12 shown in more detail with reference to Fig. 2.

The tower may have at least two and up to at least ten modules bolted together to a desired height and is retained by guy ropes 14 to the ground by fittings (not shown). Each module 12 has a plurality of apertures 16 on each of its four sides.

With reference to Fig. 2, prior to welding assembly module 12 to module 12, each module 12 is constructed from four identical angled panels, having sides 18A, 18B, 18C and 18D, by welding to form an essentially rectangular box of equal width and breadth but of a longer length (height). Apertures 16 shown in ghost lines are subsequently cut out of each of

the panel sides 18A – 18D. Typically, this prior art module 12 has a width and breadth of 41 cm and a length of 2.0 – 2.5 m.

With reference to Fig. 3, this module unit 20 according to the invention shown generally as 20 has an equal width and breadth of approximately 46 ± cm and a length of about 2.0 – 2.5 m.

Module 20 has a plurality of apertures 22 of an elongate scalloped shape, shown in ghost lines, in each of sides 24A, 24B, 24C and 24D prior to welding sides 24A-24D, together.

A modular tower structure 26 comprising a plurality of modular units 20 fixed one to another in vertical alignment is shown in Fig. 4.

Figs. 5-13 represent diagrammatic sketches of a fitting according to the invention.

With reference to Figs. 5A and 5B, this shows a side view of a fitting 30 attached to a tower member 32, in part, while retaining guy line 34 and insulator 36.

Figs. 6 and 7 are general side and top views of the relationship between the tower, attachment, guy line and insulator with direction of rotation.

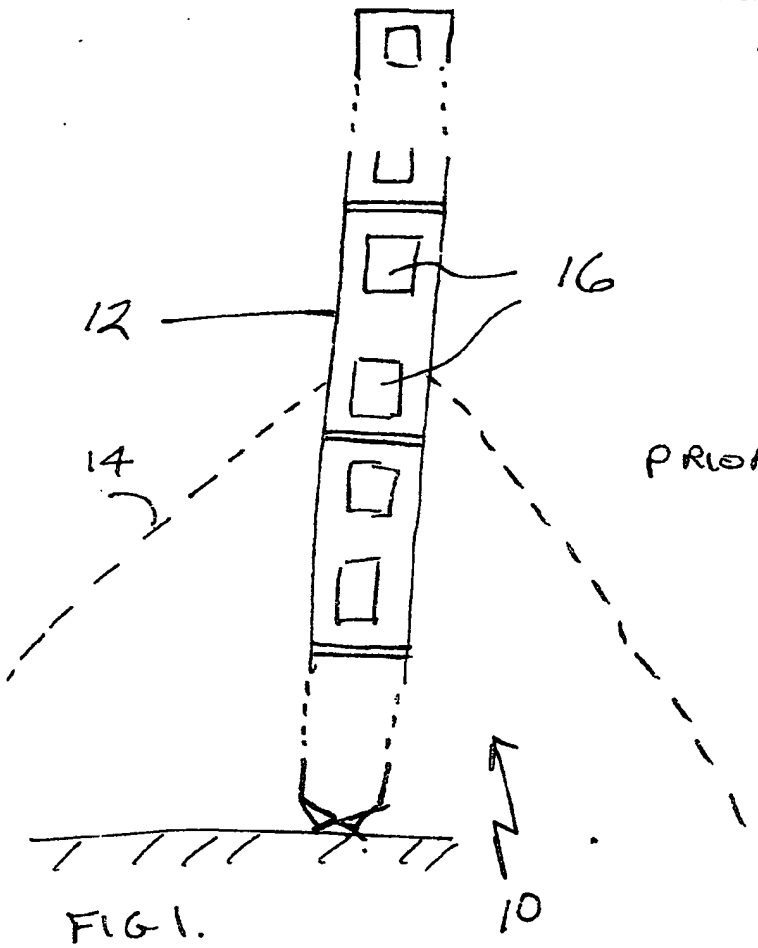
Figs. 8-10 show the attachment for attachment to the insulator and the guy wire.

Figs. 11-13 show the swivel mechanism between the tower member 32 and insulator head 36.

Although this disclosure has described and illustrated certain preferred embodiments of the invention, it is to be understood that the invention is not restricted to those particular embodiments. Rather, the invention includes all embodiments which are functional or mechanical equivalents of the specific embodiments and features that have been described and illustrated.

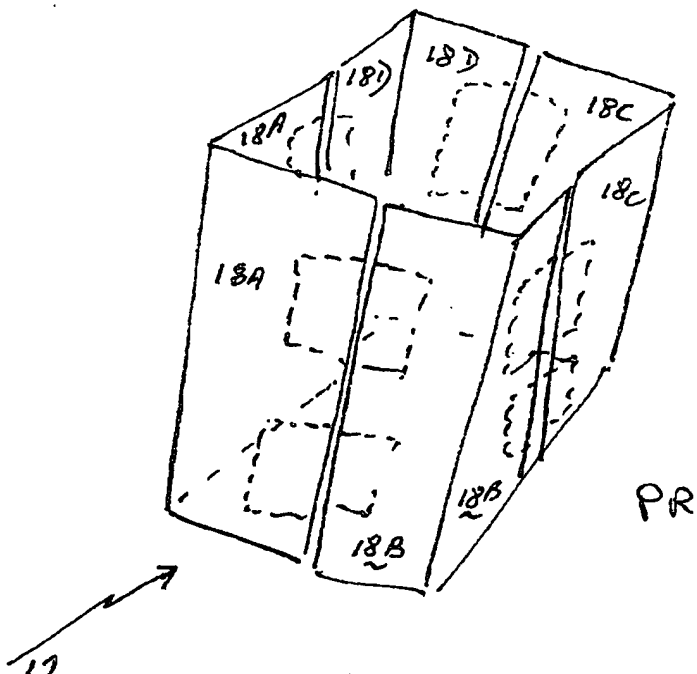
Claims

1. A modular tower structure for carrying electricity transmission cables, communication equipment and the like, comprising a plurality of rectangular aluminum modular units fixed one to another in vertical alignment, wherein each modular unit has a height, width, breadth and sides, said sides having a plurality of apertures, the improvement wherein said width and breadth are essentially equal and of 46 ± 1 cm, and the length is selected from 2.0 – 2.5 m.
2. A tower as defined in claim 1 wherein said apertures are shaped in the form of a completed, elongated horseshoe arch.
3. A modular unit as defined in claim 1 for use in said modular tower structure.



PRIOR ART

FIG 1.



PRIOR ART

FIG 2

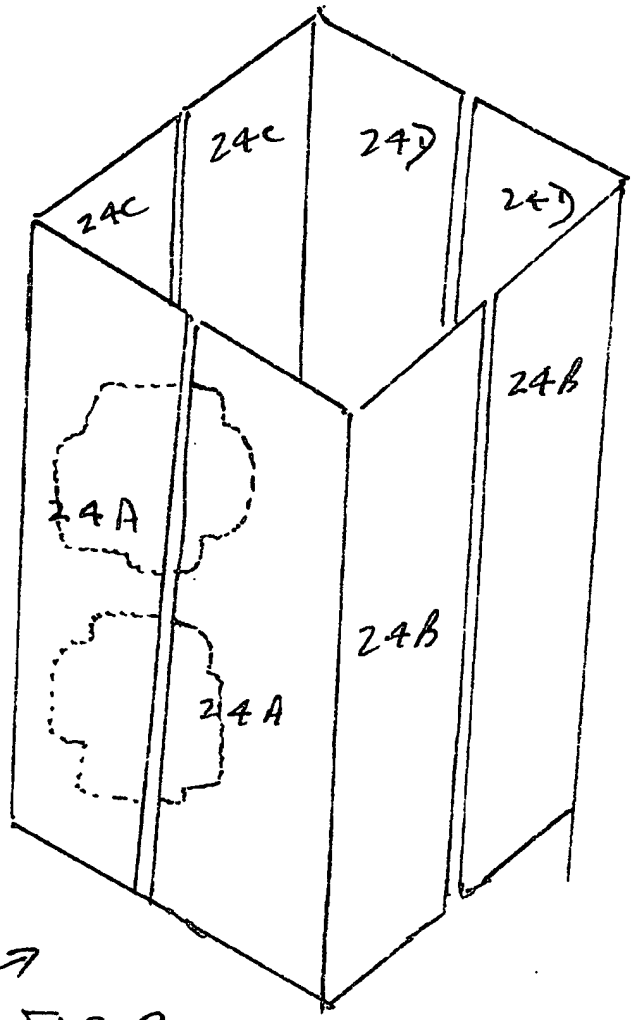


FIG 3

20

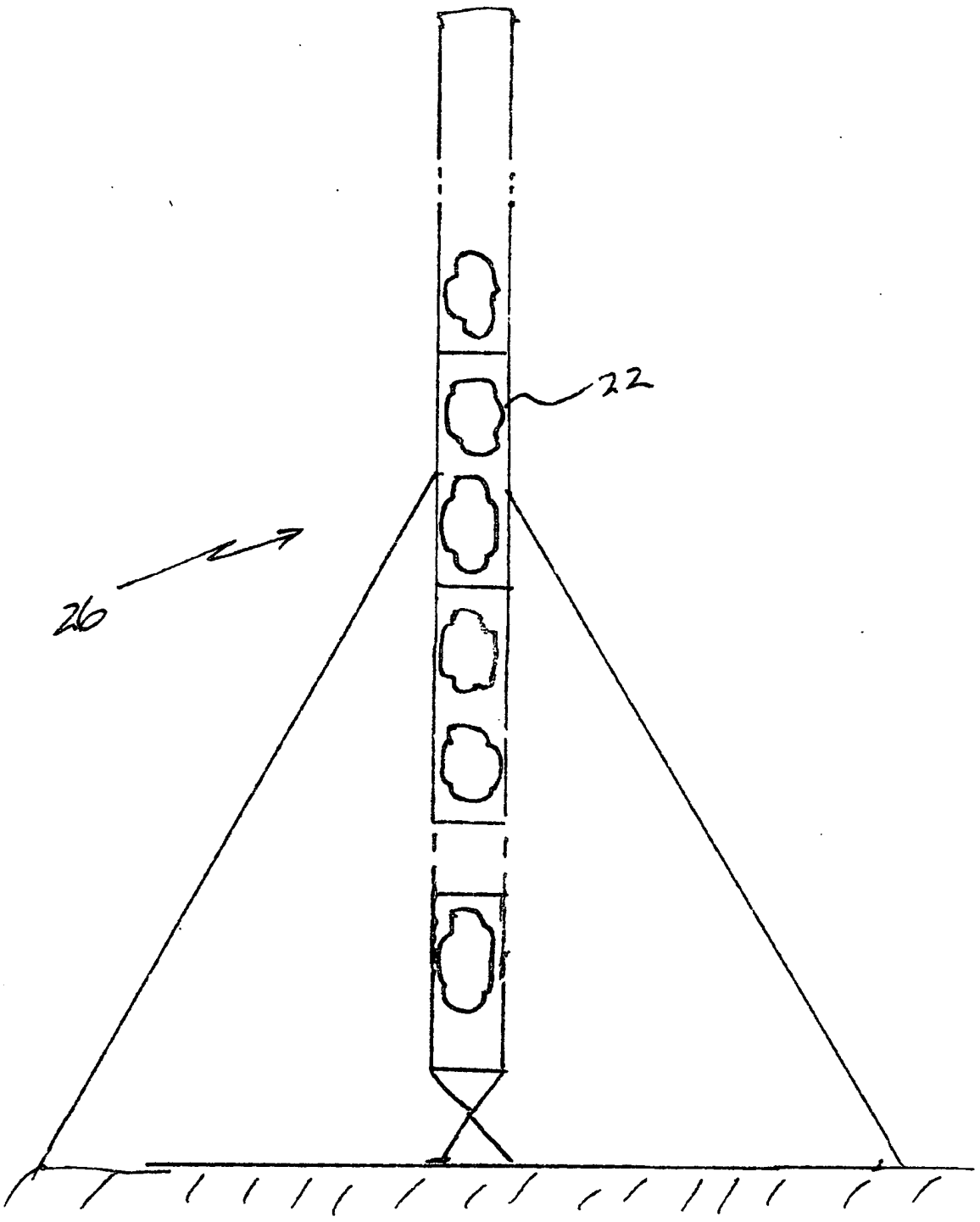


FIG 4

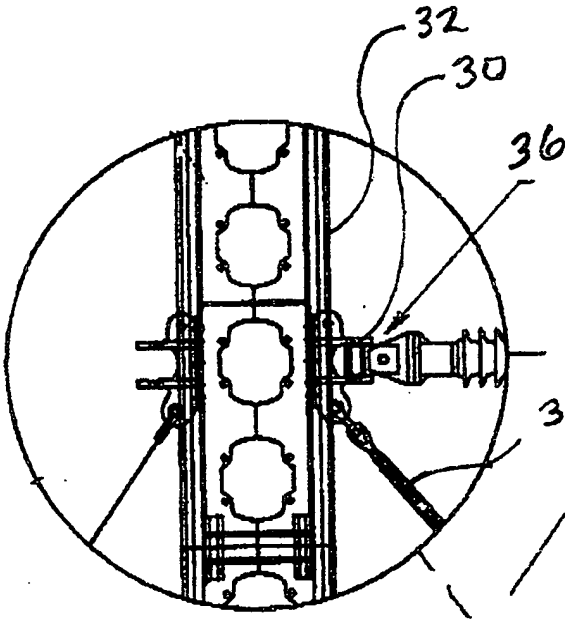


FIG 5A

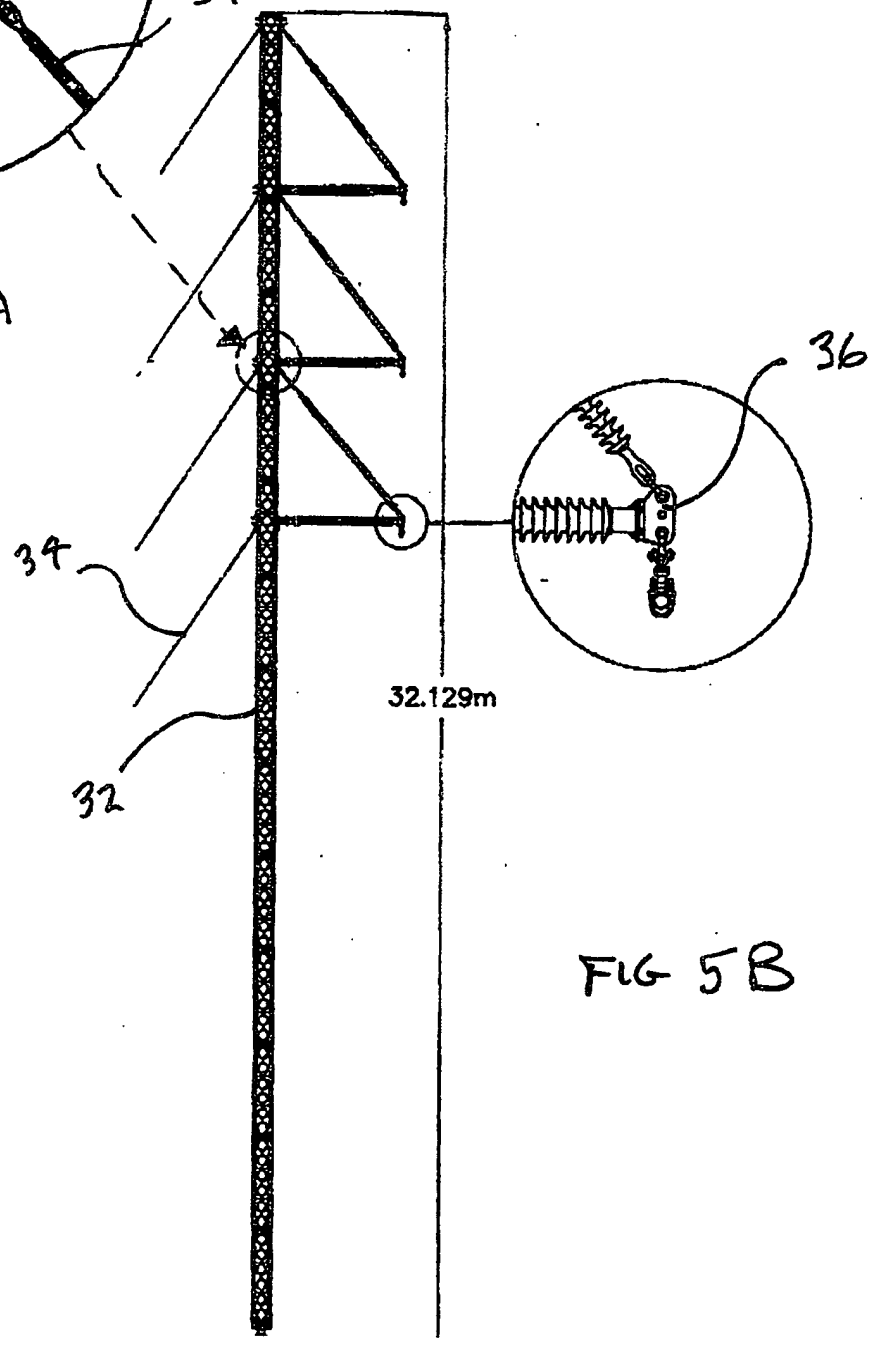


FIG 5B

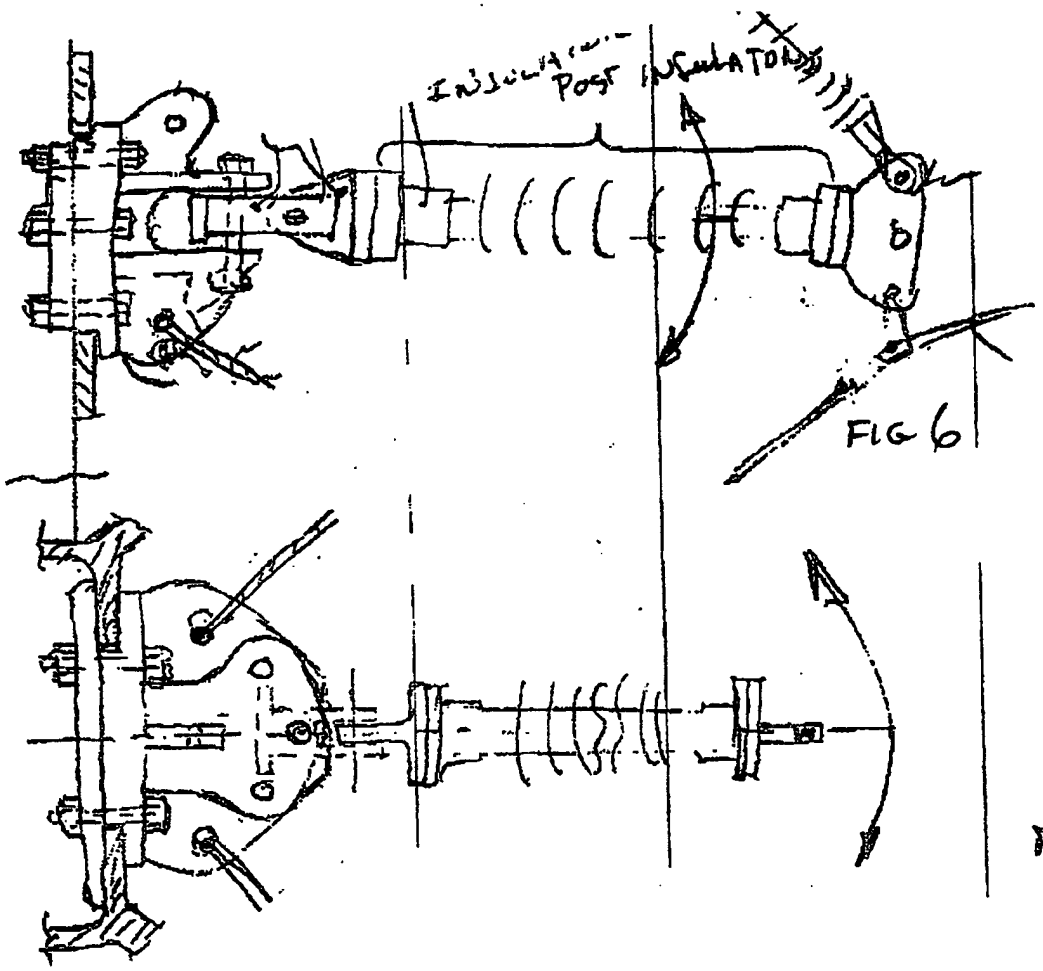


FIG 6

FIG 7

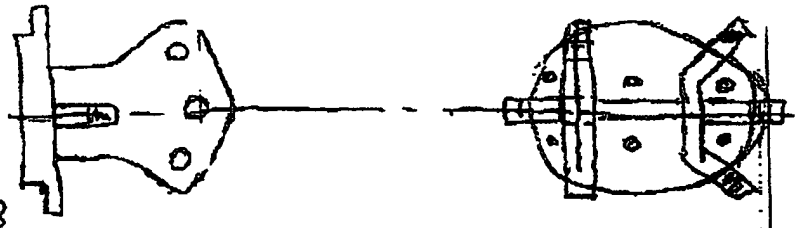


FIG 8

FIG 10

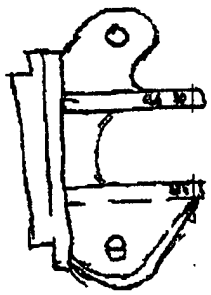


FIG 9

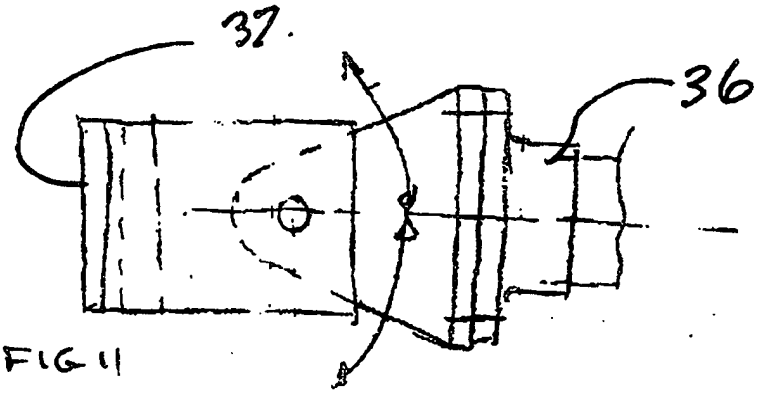


FIG 11

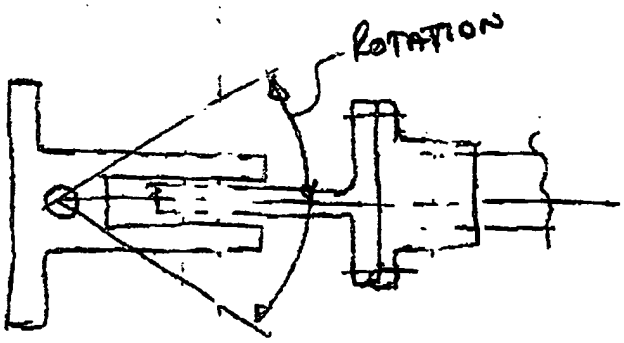


FIG 12

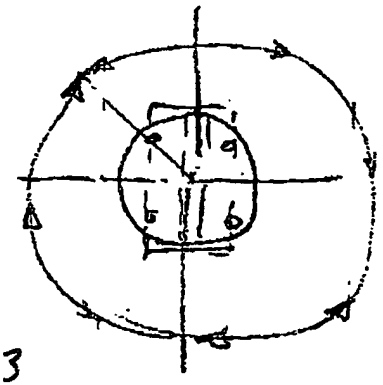


FIG 13